

# Appendix R-5

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## Alternative 5 Trip Generation Assessment



**DATE:** August 23, 2023  
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**JOB NO:** 14064-15 Alt 5 TG Memo



## **WEST CAMPUS UPPER PLATEAU ALTERNATIVE 5 TRIP GENERATION ASSESSMENT**

Urban Crossroads, Inc. is pleased to provide the following West Campus Upper Plateau Alternative 5 (**Project**) Trip Generation Assessment. The Project is located west of Cactus Avenue's current terminus, east and south of the Mission Grove neighborhood, and to the north of the Orangecrest neighborhood within the jurisdiction of the March Joint Powers Authority (**March JPA**). The purpose of the following is to provide a supplemental trip generation assessment for incorporation into the environmental document for the proposed Project Alternative 5.

### **ALTERNATIVE 5**

Specifically, Project Alternative 5 assumes the development of 374,398 square feet of commercial retail use (0.25 floor-to-area ratio or **FAR**) and 4,243,244 square feet of office park use (0.45 FAR). The Project also includes 18.08-acre public park, 42.2-acre active park, and 445-acre Conservation Area. The public park, active park, and conservation area are consistent with the currently proposed Project. The land use plan for Project Alternative 5 is shown on Exhibit 1, where the red represents commercial retail uses and the blue identifies the office park uses. Access to the office park use will be accommodated via Cactus Avenue to the east, however, the commercial retail component will also accommodate access off of Barton Street as it will include neighborhood serving uses.

**EXHIBIT 1: ALTERNATIVE 5 LAND USE PLAN**



**TRIP GENERATION**

**PROPOSED PROJECT**

The West Campus Upper Plateau Traffic Analysis (dated October 18, 2022, referred to as **2022 Traffic Study**) evaluated 2,562,561 square feet of high-cube fulfillment center warehouse use, 500,000 square feet of high-cube cold storage warehouse use, 1,763,168 square feet of business park use, 160,921 square feet of commercial retail use, 18.08-acre public park, 42.2-acre active park, and 445-acre Conservation Area. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11<sup>th</sup> Edition, 2021), the High Cube Warehouse Trip Generation Study (WSP, January 2019), and the San Diego Association of Governments (SANDAG) (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region (April 2002) were used to estimate the Project’s trip generation.

Internal capture is a percentage reduction that can be applied to the trip generation estimates for individual land uses to account for trips internal to the site. In other words, trips may be made between commercial retail use and employees of the business park/warehouse uses and can be made either by walking or using internal roadways without using external streets. For example, employees of the business park use may visit the commercial retail use without leaving the site and are therefore considered as vehicle trips that are internal to the site. The internal capture rate for

the retail, office, and restaurant uses on-site are based on the National Cooperative Highway Research Program (NCHRP) 684 Internal Trip Capture Estimation Tool. As the project is proposed to include commercial retail uses, pass-by percentages have been obtained from the ITE Trip Generation Handbook (3<sup>rd</sup> Edition, 2017).

The trip generation summary illustrating daily, and peak hour trip generation estimates for the proposed Project are summarized on Table 1. In order to accurately reflect the impact that heavy trucks would have on the street system, Project trips have been further broken down between passenger cars and trucks for each of the peak hours and weekday daily trip generation for the high-cube fulfillment center warehouse and business park uses. As shown on Table 1, the proposed Project is anticipated to generate a total of 35,314 weekday trip-ends per day with 1,761 weekday AM peak hour trips, 3,388 weekday PM peak hour trips, and 1,642 weekend Saturday peak hour trips.

**TABLE 1: PROPOSED PROJECT TRIP GENERATION SUMMARY**

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily	Saturday Peak Hour		
	In	Out	Total	In	Out	Total		In	Out	Total
Total Passenger Cars	1,356	462	1,818	911	2,442	3,353	34,116	856	815	1,671
Internal Trip Reduction	-86	-86	-172	-42	-42	-84	-856	-21	-21	-42
Total Trucks	83	32	115	33	86	119	2,054	9	4	13
<b>Proposed Project Total Trips</b>	<b>1,353</b>	<b>408</b>	<b>1,761</b>	<b>902</b>	<b>2,486</b>	<b>3,388</b>	<b>35,314</b>	<b>844</b>	<b>798</b>	<b>1,642</b>

Source: Table 4-2 of the West Campus Upper Plateau Traffic Analysis (October 18, 2022).

**PROJECT ALTERNATIVE 5**

Project Alternative 5 assumes the development of 374,398 square feet of commercial retail use and 4,243,244 square feet of office park use in place of 2,562,561 square feet of high-cube fulfillment center warehouse use, 500,000 square feet of high-cube cold storage warehouse use, 1,763,168 square feet of business park use, and 160,921 square feet of commercial retail use. Trip generation rates for Project Alternative 5 are shown on Table 2. The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual (11<sup>th</sup> Edition, 2021). The trip generation for the Shopping Center (ITE 820) land use includes a small percentage of trucks to account for deliveries, which is reflected on Table 2.

The business park component evaluated in the 2022 Traffic Study includes truck-related warehousing uses. As such, the trip generation in the 2022 Traffic Study used the General Office (ITE 710) and Warehousing (ITE 150) trip generation rates for the business park land use. Specifically, a blend of 30 percent office use and 70 percent warehousing use was evaluated for the business park land use. The Warehousing land use included ITE trip generation rates for heavy vehicles (trucks). However, the office park land use category considered and evaluated for Alternative 5 is not intended to include warehousing or other truck-related uses, and instead could house a variety of other uses including, but not limited to, offices, retail, wholesale stores, restaurants, recreational areas, scientific research functions, etc. As such, the Business Park (ITE 770) land use category was used for the purposes of calculating trip generation for Project Alternative 5. The ITE Trip Generation Manual does not provide truck-specific trip generation rates for the ITE 770 land use category.

The same sources and methodologies have been applied to calculate the internal trip reduction and pass-by trip reduction as the proposed Project. Internal capture worksheets are provided in Attachment A. The trip generation summary illustrating daily, and peak hour trip generation estimates for Project Alternative 5 are also shown on Table 2. As shown on Table 2, Project Alternative 5 is anticipated to generate a total of 65,516 weekday trip-ends per day with 6,143 weekday AM peak hour trips and 6,416 weekday PM peak hour trips, and 4,417 weekend Saturday peak hour trips.

**TABLE 2: PROJECT ALTERNATIVE 5 TRIP GENERATION SUMMARY**

Land Use <sup>1</sup>	Units <sup>2</sup>	ITE LU Code	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily	Saturday Peak Hour		
			In	Out	Total	In	Out	Total		In	Out	Total
Business Park	TSF	770	1.15	0.20	1.35	0.32	0.90	1.22	12.44	0.33	0.28	0.61
Shopping Center (Regression Equation)	TSF	820	0.56	0.34	0.90	1.85	2.00	3.85	39.41	2.52	2.32	4.84
Passenger Cars			0.55	0.34	0.89	1.85	2.00	3.85	39.32	2.52	2.32	4.84
Trucks			0.01	0.00	0.01	0.00	0.00	0.00	0.09	0.00	0.00	0.00
Active Park	AC	-- <sup>3</sup>	3.25	3.25	6.50	2.25	2.50	4.75	50.00	4.44	4.81	9.25
Public Park	AC	-- <sup>3</sup>	0.33	0.32	0.65	0.23	0.22	0.45	5.00	0.44	0.48	0.92

<sup>1</sup> Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

<sup>2</sup> TSF = thousand square feet; AC = acres

<sup>3</sup> Trip Generation Source: SANDAG (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2022. For Developed and Undeveloped Parks.

Land Use	Quantity Units <sup>1</sup>	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily	Saturday Peak Hour		
		In	Out	Total	In	Out	Total		In	Out	Total
Business Park/Office Park	4,243.244 TSF	4,869	859	5,728	1,346	3,831	5,177	52,786	1,407	1,198	2,605
Shopping Center	374.398 TSF										
Passenger Cars		206	127	333	693	749	1,442	14,722	942	870	1,812
Trucks		4	0	4	0	0	0	34	0	0	0
Internal Trip Reduction <sup>2</sup>		-104	-104	-208	-70	-70	-140	-1,428	-47	-47	-94
Pass-by Reduction (AM:0%; PM/Sat/Daily: 19%) <sup>3</sup>		0	0	0	-121	-139	-261	-2,798	-172	-163	-335
Active Park	42.20 AC	137	137	274	95	95	190	2,110	187	203	390
Public Park	18.08 AC	6	6	12	4	4	8	90	19	20	39
<b>Total Trips</b>		<b>5,118</b>	<b>1,025</b>	<b>6,143</b>	<b>1,947</b>	<b>4,470</b>	<b>6,416</b>	<b>65,516</b>	<b>2,336</b>	<b>2,081</b>	<b>4,417</b>

<sup>1</sup> TSF = thousand square feet; AC = acres

<sup>2</sup> Internal trip reduction based on NCHRP 684 Internal Trip Capture Estimation Tool for the commercial retail and business park uses.

<sup>3</sup> Pass-by reduction percentage source: ITE Trip Generation Handbook, 3rd Edition (2017).

**TRIP GENERATION COMPARISON**

Table 3 shows the trip generation comparison between the Proposed Project evaluated in the 2022 Traffic Study and Project Alternative 5. The resulting net change in trips is identified on Table 3. As shown, Project Alternative 5 is anticipated to generate a net increase of 30,202 two-way weekday trips per day with an increase of 4,382 weekday AM peak hour trips, 3,028 weekday PM peak hour trips, and 2,775 Saturday peak hour trips in comparison to the Proposed Project.

**TABLE 3: TRIP GENERATION COMPARISON**

Land Use	Quantity Units <sup>1</sup>	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily	Saturday Peak Hour		
		In	Out	Total	In	Out	Total		In	Out	Total
Proposed Project	4,986.650 TSF										
Passenger Cars		1,270	376	1,646	869	2,400	3,269	33,260	835	794	1,629
Trucks		83	32	115	33	86	119	2,054	9	4	13
Project Alternative 5	4,617.642 TSF										
Passenger Cars		5,114	1,025	6,139	1,947	4,470	6,416	65,482	2,336	2,081	4,417
Trucks		4	0	4	0	0	0	34	0	0	0
Net Change in Passenger Car Trips		3,844	649	4,493	1,078	2,070	3,147	32,222	1,501	1,287	2,788
Net Change in Truck Trips		-79	-32	-111	-33	-86	-119	-2,020	-9	-4	-13
<b>Total Net Change in Project Trips</b>		<b>3,765</b>	<b>617</b>	<b>4,382</b>	<b>1,045</b>	<b>1,984</b>	<b>3,028</b>	<b>30,202</b>	<b>1,492</b>	<b>1,283</b>	<b>2,775</b>

<sup>1</sup> TSF = thousand square feet

If you have any questions or comments, I can be reached at [cs0@urbanxroads.com](mailto:cs0@urbanxroads.com)

**ATTACHMENT A**  
**INTERNAL CAPTURE WORKSHEETS**



NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	West Campus	Organization:	Urban Crossroads, Inc.		
Project Location:	March JPA	Performed By:	CS		
Scenario Description:	Alternative 5	Date:	5/4/2023		
Analysis Year:		Checked By:			
Analysis Period:	AM Street Peak Hour	Date:			

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				5,728	4,869	859
Retail				337	210	127
Restaurant				0		
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				6,065	5,079	986

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses <sup>2</sup>						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		67	0	0	0	0
Retail	37		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	6,065	5,079	986
Internal Capture Percentage	3%	2%	11%
External Vehicle-Trips <sup>5</sup>	5,857	4,975	882
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	1%	8%
Retail	32%	29%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	West Campus	Organization:	Urban Crossroads, Inc.
Project Location:	March JPA	Performed By:	CS
Scenario Description:	Alternative 5	Date:	5/4/2023
Analysis Year:		Checked By:	
Analysis Period:	PM Street Peak Hour	Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				5,177	1,346	3,831
Retail				1,442	693	749
Restaurant				0		
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				6,619	2,039	4,580

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses <sup>2</sup>						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		55	0	0	0	0
Retail	15		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	6,619	2,039	4,580
Internal Capture Percentage	2%	3%	2%
External Vehicle-Trips <sup>5</sup>	6,479	1,969	4,510
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	1%	1%
Retail	8%	2%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.